wrought iron, as on steel and pig iron, no matter whether the same is* in a solid or liquid condition. If one frees molten iron from the usual slag covering swimming thereon and exposes the bare upper surface to the action of the air or a gas flame, one sees forthwith black points originate thereon, which magnify and soon unite themselves into a connected layer. The black newly-formed substance is again scale. Pure scale is infusible in all cases coming into consideration, even at the highest temperatures of the open-hearth process.

(ty FORMATION OF SLAG.

Scale has, like all iron-oxides, the property of going into combination with silicic acid, and also with lime and small amounts of silicic acid, which at moderately high temperatures are fluid. But now silica and lime are the substances which form the chief constituents of the materials which serve for lining of all our furnaces and apparatuses for the heating of iron and for handling of the same in the fluid state. If, therefore, iron is heated in such apparatuses and the scale formed comes in contact with the walls of the same, mutual reaction must take place. A liquid is formed with the scale. This liquid is called slag, and it endeavours to change its composition so long as it has not become neutral to its surroundings.

Slag is thus an additional or by-product, which must be taken off. Therefore, already on technical working grounds, its degree of fluidity must be so great that it admits of being withdrawn without trouble from the apparatus. The degree of fluidity depends again now on the temperature and composition of the slag, and, therefore, the composition of the same must at all times be governed by the corresponding temperature.

The chief constituents observed in freshly-formed slags are the iron silicates, and these are Fe2Si04, with 29-4 per cent., Si02 and 70;6 per cent, of FeO, which contains 2-4 units of weights of FeO per unit of weight of Si02 . . . (28), and FeSi03, with 45*5 per cent, Si02 and 54'5 per cent. FeO, in which for one unit of weight of Si02 there are T2 units of weight of FeO . . . (29). These substances are easily